

machine element; and

a sensor attached to on the interior surface of the machine element and positioned to detect intensity of light within the machine element wherein the intensity of light corresponds to a position of the head element within the machine element at any point between the first end and the second end.

2. (Original) The apparatus of Claim 1 further comprising:
a coating on the shaft element.
3. (Previously amended) The apparatus of Claim 1 further comprising:
a coating on the interior surface of the machine element.
4. (Original) The apparatus of Claim 1 further comprising:
a seal disposed around the shaft element.
5. (Previously amended) The apparatus of Claim 1 further comprising:
a second sensor attached to the first wall.
6. (Previously amended) The apparatus of Claim 1 further comprising:
a first brush positioned at the second wall of the machine element.
7. (Original) The apparatus of Claim 6 wherein the first brush is constructed from wire.
8. (Previously amended) The apparatus of Claim 1 further comprising:

a second light source attached to the machine element at the first wall of the machine element.

9. (Previously amended) The apparatus of Claim 1 wherein the light source is attached at the second wall.

10. (Previously amended) The apparatus of Claim 1 further comprising:

a coating on the head element.

11. (Currently amended) An apparatus for cleaning a machine component, the apparatus comprising:

a machine element having a body defining an interior wherein the body has an interior surface and a length defined between a first end and a second end wherein the first end has an interior wall and an exterior wall opposite the interior wall;

a shaft element movable within the machine element;

a head element attached to the shaft element and adjacent to the interior surface of the machine element; and

a first brush positioned on the exterior to wall of the first end of the body of the machine element wherein the first brush is in contact with contacts the shaft element.

12. (Original) The apparatus of Claim 11 further comprising:

a seal disposed around the shaft.

13. (Original) The apparatus of Claim 11 further comprising:

a coating on the shaft element.

14. (Previously amended) The apparatus of Claim 11 further

comprising:

a second brush positioned exterior to the body of the machine element.

15. (Original) The apparatus of Claim 11 further comprising:

a light source attached to the machine element.

16. (Original) The apparatus of Claim 11 further comprising:

a sensor positioned to receive reflected light within the machine element.

17. (Previously amended) A method for measuring displacement of a machine element, the method comprising the steps of:

providing a machine element having a body defining an interior wherein the body has an interior surface and a length defined between a first end and a second end;

providing a shaft element capable of movement within the machine element;

attaching a head element to the shaft element;

positioning the head element adjacent to the interior surface of the machine element;

attaching a light source to the machine element on a first side of the head element;

attaching a sensor to the machine element on a second side of the head element wherein the first side and the second side are not the same; and

measuring intensity of light within the machine element from

reflected light detected by the sensor.

18. (Original) The method of Claim 17 further comprising the steps of:

moving the shaft element; and

producing an output signal as the shaft element moves within the machine element.

19. (Previously amended) The method of Claim 18 further comprising the steps of:

providing a processing unit that receives the output signal; and displaying the output signal.

20. (Currently amended) The method of Claim 17 further comprising the step of:

positioning a seal ~~exterior to~~ within the machine element.

21. (Original) The method of Claim 17 further comprising the step of:

attaching a first brush to the machine element.

22. (Previously amended) The method of Claim 21 further comprising the step of:

attaching a second brush to the machine element.